

What is claimed is:

1. An air purifying filter media having a dry tensile strength, a wet tensile strength in association with water resistance and water repellency and exhibiting bactericidal/sterilizing or antimicrobial means properties using enzyme reaction, obtained by applying a mixture of the modified enzyme which has an ionic polarity opposite to the ionic polarity of the whole filter media fiber having a functional group and which has sterilizing properties, and an ionic synthetic resin binder having the opposite ionic polarity similar to the modified enzyme, to the whole filter media fiber as described above.

2. The air purifying filter media according to claim 1, wherein the filter media fiber having the functional group is at least one of a group consisting of inorganic fiber, nature fiber or derivative thereof, organic synthetic fiber having at least one of a group consisting of hydroxyl and carboxyl group having an anionic polarity, and an amino or an imino group having a cationic polarity.

3. The air purifying filter media according to claim 1 or 2, wherein the filter media fiber is at least one fiber having at least one of a group consisting of a hydroxyl and carboxyl group having an anionic polarity, and an amino or an imino group having a cationic polarity, and selecting from a group consisting the inorganic fiber from boron-silica glass fibers, alkyl amine glass fibers, silica-alumina fibers; the nature fiber or derivative thereof selected from non-wood fiber or wood fibers, namely, rayon fibers, cotton fibers, hemp fibers, wool fibers; the organic synthetic fibers selected from polyamide fibers, polyvinyl alcohol fibers, acetate fibers, polyacrylamide fibers or copolymer thereof.

4. The air purifying filter media according to one from claims 1 to 3, wherein the modified enzyme being immobilized on the functional group of the filter media fiber is at least one modified enzyme selected from a group consisting of N-substituted carbamate bromide, N-substituted imide carbonate bromide, acetyl bromide + triacetyl cellulose, dimethylaminoethyl, diethylaminoethyl, protamine, polyethylene imine, polyvinyl amine, polyallyl amine, polylysine, polyornitine, dextran, dextran sulfate, dextrin and chondroitin sulfate.

5. The air purifying filter media according to one from claims 1 to 3, wherein the to be modified enzyme is at least one selected from a group consisting of β -1,3-glucanase, chitinase, lysozyme, protease, glucosirase, β -galactosidase, endo- β -N-acetylglucosamidase and endolysin.

6. The air purifying filter media according to one from claims 1 to 5, wherein the ionic synthetic resin binder is at least one selected from a group consisting of

acrylic resin, urethane resin, vinyl acetate resin, SBR resin, Epoxy resin, polyvinyl alcohol resin.

7. The air purifying filter media according to one from claims 1 to 6, wherein the used amount of the modified enzymes is 0.01% by weight or more, based on the weight of the filter media.

8. The air purifying filter media according to one from claims 1 to 7, wherein the used amount of the ionic synthetic resin binder is 0.1 to 10.0% by weight, based on the weight of the filter media.

9. The air purifying filter media according to one from claims 1 to 8, wherein the dry tensile strength of the filter media, measured according to MIL-F-51079 C, is 0.45 kN/m or more in a machine direction of the filter media and 0.35 kN/m or more in a cross direction of the filter media.

10. The air purifying filter media according to one from claims 1 to 9, wherein the wet tensile strength of the filter media, measured according to MIL-F-51079 C, is 0.176 kN/m or more in a cross direction of the filter media.

11. The air purifying filter media according to one from claims 1 to 10, wherein the water repellency of the filter media comprising the glass fiber as main component, measured according to MIL-282, is 150mm or more (the height of the water column).

12. The air purifying filter media according to one from claims 1 to 10, wherein the main component of the filter media fiber is selected from the nature fiber or derivative thereof selected from non-wood fiber or wood fibers, namely, rayon fibers, cotton fibers, hemp fibers, wool fibers; the organic synthetic fibers selected from polyamide fibers, polyvinyl alcohol fibers, acetate fibers, polyacrylamide fibers or copolymer thereof, and the water repellency of the filter media, measured according to MIL-282, is 100mm or more (the height of the water column).

13. The air purifying filter media according to one from claims 1 to 12, wherein the sterilization ratio is 99.9% or more.

14. The air purifying filter media according to one from claims 1 to 13, wherein other than the modified enzyme and the ionic synthetic resin binder, the water repellent agent is additionally applied.

15. The air purifying filter media according to one from claims 1 to 13, wherein the applied amount of the water repellent agent is 0.1% by weight or less, based on the filter media.

16. The air purifying filter media according to one from claims 1 to 14, wherein in addition to the ionic synthetic resin binder an internal fibrous binder is used.

17. A process for the preparation of the air purifying filter media according to one from claims 1 to 16, wherein, after preparation of a slurry containing the filter media fiber having the functional group, to a wet paper web produced from the slurry under dehydration by using a wet-type paper machine or a dried paper thereof, the modified enzyme and an ionic synthetic resin binder and, if desired, the water repellent agent is applied.

18. The process according to claim 17, wherein the wet paper web applied the modified enzyme and the ionic synthetic resin binder and, if desired, the water repellent agent or the dry paper is dried at a temperature between 80°C to 220°C.